

Advances in Intelligent Systems and Computing 866

Pandian Vasant
Ivan Zelinka
Gerhard-Wilhelm Weber *Editors*

Intelligent Computing & Optimization

 Springer

© 2019

Intelligent Computing & Optimization

Editors: **Vasant**, Pandian, **Zelinka**, Ivan, **Weber**, Gerhard-Wilhelm (Eds.)

Contents

A System for Monitoring the Number and Duration of Power Outages and Power Quality in 0.38 kV Electrical Networks	1
Alexander Vinogradov, Vadim Bolshev, Alina Vinogradova, Tatyana Kudinova, Maksim Borodin, Anastasya Selesneva, and Nikolay Sorokin	
A Novel Application of System Survival Signature in Reliability Assessment of Offshore Structures	11
Tobias-Emanuel Regenhardt, Md Samdani Azad, Wonsiri Punurai, and Michael Beer	
Security Assurance Against Cybercrime Ransomware	21
Habib ur Rehman, Eiad Yafi, Mohammed Nazir, and Khurram Mustafa	
SAR: A Graph-Based System with Text Stream Burst Detection and Visualization	35
Tham Vo Thi Hong and Phuc Do	
Detection of Black Hole Attacks in Mobile Ad Hoc Networks via HSA-CBDS Method	46
Ahmed Mohammed Fahad, Abdulghani Ali Ahmed, Abdullah H. Alghushami, and Sammer Alani	
Network Intrusion Detection Framework Based on Whale Swarm Algorithm and Artificial Neural Network in Cloud Computing	56
Ahmed Mohammed Fahad, Abdulghani Ali Ahmed, and Mohd Nizam Mohmad Kahar	
The ‘Smart’ as a Project for the City Smart Technologies for Territorial Management Planning Strategies	66
Cinzia Bellone and Vasiliki Geropanta	

Detection of Black Hole Attacks in Mobile Ad Hoc Networks via HSA-CBDS Method

Ahmed Mohammed Fahad^{1(&)}, Abdulghani Ali Ahmed¹, Abdullah H. Alghushami², and Sammer Alani³

¹Faculty of Computer System & Software Engineering, Universiti Malaysia Pahang, 26300 Kuantan, Malaysia

ahmedsipher2010@yahoo.com, abdulghani@ump.edu.my

²Information Technology Department, The Community College of Qatar, Doha, Qatar

abdullah.alghushami@ccq.edu.qa

³Faculty of Electronic and Computer Engineering (FKEKK), UTEM University, Durian Tunggal, Malacca, Malaysia
itsamhus@gmail.com

ABSTRACT

Security is a critical problem in implementing mobile ad hoc networks (MANETs) because of their vulnerability to routing attacks. Although providing authentication to packets at each stage can reduce the risk, routing attacks may still occur due to the delay in time of reporting and analyzing the packets. Therefore, this authentication process must be further investigated to develop efficient security techniques. This paper proposes a solution for detecting black hole attacks on MANET by using harmony search algorithm (DBHSA), which uses harmony search algorithm (HSA) to mitigate the lateness problem caused by cooperative bait detection scheme (CBDS). Data are simulated and analyzed using MATLAB. The simulation results of HSA, DSR, and CBDS-DSR are provided. This study also evaluates the manner through which HSA can reduce the inherent delay of CBDS. The proposed approach detects and prevents malicious nodes, such as black hole attacks that are launched in MANETs. The results further confirm that the HSA performs better than CBDS and DSR.

KEYWORDS

Dynamic source routing; Cooperative bait detection scheme; Harmony search algorithm; Black hole attack

Acknowledgements

This work was supported by the Faculty of Computer System and Soft-ware Engineering, Universiti Malaysia Pahang under FRGS Grant No. RDU160106 and RDU Grant No. RDU160365.

References

1. Vimala, S., Srivatsa, S.: Security using data compression in MANETS, pp. 528–531 (2017)
2. Taneja, S., Kush, A.: A survey of routing protocols in mobile ad hoc networks. *Int. J. Innov. Manag. Technol.* **1**(3), 279 (2010)
3. Ahmed, A.A., Jantan, A., Wan, T.-C.: SLA-based complementary approach for network intrusion detection. *Comput. Commun.* **34**(14), 1738–1749 (2011)
4. Akbani, R., Korkmaz, T., Raju, G.: Mobile ad-hoc networks security. In: *Recent Advances in Computer Science and Information Engineering*, pp. 659–666. Springer, Berlin (2012)
5. Ahmed, A.A., Sadiq, A.S., Zolkipli, M.F.: Traceback model for identifying sources of distributed attacks in real time. *Secur. Commun. Netw.* **9**(13), 2173–2185 (2016)
- 6.